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Withholding Taxes and International Bank Credit Terms

Harry Huizinga

International differences in withholding tax rates on interest payments on international loans are reflected in bank credit terms. As a result of the limits on tax credits for foreign-interest withholding taxes introduced in the 1986 U.S. tax reform, credit terms for developing countries will probably be less favorable.

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This paper — a product of the Debt and International Finance Division, International Economics Department — is part of PRE's continuing effort to understand what determines the cost and quantity of commercial bank credit available to developing countries. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Sheilah King-Watson, room S8-040, extension 31047 (32 pages).

Many countries levy withholding taxes on interest payments on international bank loans and other debt instruments. These withholding taxes can be credited against taxable income in the major creditor nations, such as the United States and the United Kingdom.

International bank loan contracts conventionally state the interest rate or spread above the benchmark rate net of withholding taxes. For a given net interest rate, an increase in the withholding tax rate increases the withholding taxes paid in the borrower country as well as creditable in the creditor country. So international bank loans become more profitable to the banks the higher the rate of withholding tax imposed by the borrower country.

As banks compete for loans, one expects these institutions to offer low interest spreads to countries that impose high withholding taxes. Huizinga shows empirically that international differences in withholding tax rates are indeed largely reflected in bank credit terms.

Using a sample of 510 loans to 14 debtor nations originated between 1971 and 1981, he finds that the developing countries have been able to reduce their interest expense by an estimated 56 cents for every dollar of tax withheld at the source. U.S. banks passed on close to 100 percent of their potential U.S. income tax credits to developing countries by way of lower interest spreads during the go-go lending years of 1976-78.

The cost of bank credit to developing countries is made unstable, however, as loan spreads reflect the cyclical marginal value of tax credits to the commercial banks. In particular, tax credits were fully reflected in loans with maturities of four years or less, but only partially in longer-term loans. The rationale appears to be that banks have doubts whether tax credits flowing from long-term loans will still be allowed in the future. They may also doubt whether they will have enough taxable income to actually realize the full tax savings offered by the tax credit.

Huizinga concludes that tax treatment in the creditor country of interest income from foreign sources probably still has an important effect on credit terms. In particular, limits on tax credits for foreign-interest withholding taxes, as effectively introduced by the 1986 U.S. tax reform, will probably lead to less favorable credit terms.

Withholding Taxes and International Bank Credit Terms

by
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Table of Contents

* This research was conducted while the author was a consultant at the Debt and International Finance Division, International Economics Department of the World Bank. The author thanks participants of the Tax Discussion Group at Stanford Law School, particularly Joe Bankman, for helpful comments.

1. Introduction

Many countries levy withholding taxes on interest payments on international bank loans and other debt instruments. These withholding taxes can be credited against taxable income in the major creditor nations, such as the United States and the United Kingdom. International bank loan contracts conventionally state the interest rate or spread above the benchmark rate net of withholding taxes. For a given net interest rate, an increase in the withholding tax rate increases the withholding taxes paid in the borrower country as well as creditable in the creditor country. Hence, international bank loans become more profitable to the banks the higher the rate of withholding tax imposed by the borrower country. As banks compete for loans, one expects these institutions to offer low interest spreads to countries that impose high withholding taxes. This paper shows empirically that international differences in withholding tax rates indeed to a large extent are reflected in bank credit terms.

Using a sample of 510 loans to 14 debtor nations originated during the years 1971-1981, we find that the developing countries have been able to reduce their interest expense by an estimated 56 cents for every dollar of tax withheld at the source. U.S. banks are shown to have passed on close to 100 per cent of their potential U.S. income tax credits to developing countries by way of lower interest spreads during the go-go lending years of 1976 to 1978. In particular, tax credits are shown to be fully reflected in loans with maturities of four years or less, but only partially in longer term loans. The rationale appears to be that banks have doubts whether tax credits flowing from long term loans will still be allowed in the future, and they may doubt whether they will have sufficient taxable income to actually

realize the full tax savings offered by the tax credit.

Bank valuation of potential tax credits varies with the business cycle, as bank taxable income is very cyclical. During recessions potential tax credits are not valuable to the banks as they are not very profitable, and thus one expects interest spreads not to reflect international differences in withholding tax rates. Indeed, interest spreads are shown to be invariant to withholding tax rates after the two oil crises during the years 1975-1976 and again during 1980-1981. At the same time, tax credits were in large measure reflected in interest spreads around 1978, as creditor economies recovered after the first oil shock. The apparent countercyclicality of the cost of bank credit to developing countries has proven to be a destabilizing factor in the flow of funds to developing countries.

The academic literature has almost completely ignored the impact of creditability of withholding taxes on bank credit terms. Lindert [1989], for example, computes the realized return on international bank loans to developing countries as of 1986 without taking into account the creditability of interest withholding taxes, thus severely underestimating the true returns to these loans. Frankel [1984, 1985], however, points out the role of the interest tax credit in banks' asset allocation choice, and in the pricing of loans.

The tax credit gives countries the obvious incentive to increase the withholding tax rate, but this does not appear to have happened on a large scale. In a more subtle way, governments have attempted to borrow indirectly through private banks or enterprises that are subject to the withholding tax. This enables the creditor bank to obtain the creditor country tax credit, and to lend at a lower net interest, to the benefit of the borrower country.

Frankel [1985, p. 5] points out that developing countries, and in particular Brazil, have reacted by directly or indirectly offering withholding tax rebates to private borrowers, thus ensuring tax credit induced spread discounts while minimizing the impact of the withholding tax on domestic borrowers. In response, creditor governments have acted to limit the creditability of interest withholding taxes. The United Kingdom, for instance, limited the creditability of Brazil's withholding tax to 15 per cent in 1982, while Brazil's withholding tax rate was 25 per cent. The 15 per cent limit now applies to all countries.[1]

The U.S. has responded, in the Tax Reform Act of 1986, by forcing banks to allocate their foreign source income into essentially three separate baskets and to calculate the foreign tax credit separately for each of the three baskets.[2] The three baskets are (i) financial services income, (ii) high withholding tax interest income, and (3) dividend income paid by non controlled foreign corporations. High withholding tax interest is gross interest taxed at a withholding tax rate of 5 per cent or more. Low withholding tax interest income, which is the remaining interest income, is included in the financial services income basket. Excess tax credits may be carried forward seven years or back two years to reduce taxes on income in the same basket. The effect of this legislation has been to disallow U.S. banks to use credit for high withholding taxes to reduce the U.S. tax on the banks' low withholding tax interest income and income from financial services.

Ironically, the 1986 tax reform almost coincided with the launching of the Baker plan for dealing with third world debt in 1985. The plan called for continued voluntary bank lending to the developing countries at almost

the same time that the tax incentives for such lending were reduced. A lesson for the future may be that tax incentives for capital flows to developing countries in various kinds should be in line with or at least not undermine stated policy objectives regarding these flows.

The remainder of this paper is organized as follows. Section 2 describes the banks' international lending decision and derives the estimating equation. Section 3 discusses the data and presents the empirical results. Section 4 concludes.

2. The Determination of Loan Spreads

Following Feder and Just [1977], several authors have investigated to what extent country risk factors are reflected in the spread over Libor charged on international loans. Edwards [1984] shows that the spreads of loans to developing countries during the period 1976-1980 are positively related to the country's debt to output ratio. Ozler [1988] shows that LDC loan spreads also reflect payments problems in earlier periods. Ozler [forthcoming] argues that the downward trends in spreads during the 1970's are consistent with gradual learning by the commercial banks about a country's creditworthiness. This section extends the empirical framework to take account of the impact of withholding taxes on interest spreads.

Credit terms in international loan contracts can be on a net or a gross basis. Net loan contracts specify the interest payments the bank receives net of withholding tax, while a gross loan contract states the interest payment to the creditor subject to the withholding tax. Obviously, with gross contracts, the net interest payments out of the country can be rather risky, as they are subject to unforeseen changes in the withholding tax.

Until the mid 1970's, the Internal Revenue Service did not allow a U.S. tax credit for foreign tax withheld on net loans, as it was argued that the interest tax was paid by the borrower and not by the U.S. bank. Until then U.S. banks had an incentive to write gross loan contracts, even though such loan carried a risk of higher future withholding taxes. Starting in the mid 1970's, however, the Internal Revenue Service recognized withholding tax credits for all international loans and the incentive to write gross loans disappeared. Overall the banking convention has been to write net international loan contracts.

Let i be the net interest rate in an international loan contract, and let τ be the rate of withholding tax levied by the borrowing country. The gross interest rate is then $i/(1-\tau)$, and the tax withheld per dollar of debt is $i\tau/(1-\tau)$. Withholding tax rates on interest typically range from 0 to 30 per cent, while corporate tax rates in the major creditor countries are at least 30 per cent. This suggests that banks would never be in an excess credit position.[3] However, this is not the case as creditor and borrower country definitions of income typically differ. In particular, the withholding tax is imposed on all interest income, while the creditor country taxes interest income net of interest expense and maybe some other bank expenses. As an example, let $\tau = 0.20$, $i = 0.10$, and let the bank's cost of funds, denoted i^*, be 0.08. The gross interest rate is 0.125 (from 0.10/(1.0 - 0.2)). Per dollar lent, the tax withheld by the borrowing country is 0.025 (from (0.10*0.20/(1 - 0.20)). Income by creditor country definition is 0.045 per dollar lent. Hence, the effective borrowing country tax - by creditor country definition - is 56 (from 0.025/0.045) per cent rather than 20 per cent. This means the bank may well be in excess credit

position, as 56 per cent exceeds, for instance, the U.S. corporate tax rate.

For a bank in excess credit, let $\beta i(\tau/1-\tau)$ be the actual value of the tax credit to the bank measured in before tax income per dollar of debt. Hence, the effective gross interest rate the bank receives is $i[1 + \beta(\tau/1-\tau)]$. With $\beta = 1$, the bank can take the full tax credit. In this instance, the marginal creditor country income tax is the creditor country corporate tax rate. This tax rate, however, does not affect the interest rate i as we assume the bank's cost of funds can be fully expensed against creditor country taxable income. With $\beta < 1$, the bank cannot take the full credit and the bank is in an excess credit position. Now the marginal creditor country income tax is zero.

The size of β increases with the creditor country tax rate, if in fact the bank is in an excess credit position. This is the case as for a bank in an excess credit position the U.S. tax liability on foreign source income is a binding constraint on the actual tax credit taken. Hence, an increase in the U.S. tax rate that relaxes this constraint increases the share of the potential tax credit that is actually taken. Similarly, β decreases with the withholding tax rate. However, the magnitude of β in practice does not follow just from the tax details of a specific loan. Rather, the extent to which the potential tax credits associated with a certain loan can be used depends on the availability of other lower withholding tax income and other bank income for which creditor country taxes can be offset by the credit. In particular, β will be larger the more profitable a bank's general operations in the foreign source from which the interest originates. U.S. tax changes introduced in 1986 that compelled banker to calculate tax credits for separate baskets of income effectively reduced β.

When setting loan spreads, banks take into account future tax credits as well as risk factors that affect the probability of loan default. Let p stand for the probability of loan default. For simplicity, we assume that in case of default the bank is not repaid at all. Banks are assumed to be risk neutral. Bank rivalry ensures that the bank's expected return - inclusive of the tax credit - equals the bank's cost of funds. Formally, the loan interest rate is determined such that

$$(1 - p)[1 + i(1 + \beta \frac{\tau}{1 - \tau})] = 1 + i^* \qquad (1)$$

In the empirical section, the bank's cost of funds will be taken to be the London Interbank Offer Rate (LIBOR). The above formulation implies full loss offset of lost principal in case the country defaults and the bank faces a positive marginal creditor country corporate tax rate. Relationship (1) may not simultaneously hold for all banks in all countries or even the same country. Rather, the banks that can make the most of the credit, and thus have the highest β, will make the loan and determine the interest rate i.[4]

The probability of default generally is assumed to depend on country as well as loan characteristics. Variables that have been considered good indicators of creditworthiness include the country's debt service to exports ratio, and debt to gnp ratio. Loan characteristics that may influence default are the size of the loan and loan maturity. The probability of default can also be expected to be related to the bank's required rate of return i^*, as it affects i and as high interest charges make loan default more likely. The probability of default is posited to have the following particular functional form

$$\rho = \frac{i^* \sum_{i=1}^{n} \alpha_i x_i}{1 + i^* \sum_{i=1}^{n} \alpha_i x_i} \tag{2}$$

where x_i is a default risk factor other than the interest rate i^*.

From (1) and (2) we can derive the following expression

$$S = \sum_{i=1}^{n} \alpha_i \frac{1 - \tau}{1 + \tau(\beta-1)} (1+i^*)x_i - \frac{\beta\tau}{1 + \tau(\beta-1)} \tag{3}$$

where

$$S = \frac{i - i^*}{i^*}$$

Thus S is the contractual interest spread, $i - i^*$, divided by the bank's cost of funds i^*. Linearizing (3) around $\tau = 0$ and $\beta = 1$ yields

$$S = \sum_{i=1}^{n} \alpha_i z_i - \tau \tag{4}$$

where

$$z_i = (1-\tau)(1 + i^*)x_i$$

The equation that is actually estimated is

$$S = \alpha_0 + \sum_{i=1}^{n} \alpha_i z_i - \beta\tau + \epsilon \tag{5}$$

where α_0 is a constant and ϵ if is a random disturbance.[5]

As pointed out, not all tax credits can be used if the banks has

insufficient taxable income. The above basically single period specification abstracts from the fact that, for instance in the United States, banks that do not have sufficient current taxable income are allowed to carry credits backwards two years, and to carry them forward for seven years. Under current rules, banks can only carry credits forward to reduce future taxes on income in the same basket. Clearly, postponing taking the credits reduces their present value. Also, what is important in this regard is the availability to banks of other ways to shelter income. As pointed out by Frankel [1985], banks were allowed to deduct interest expenses incurred to carry tax-exempt bonds from taxable income during the period under consideration. Hence, foreign tax credits may not have been of immediate importance for the U.S. banks. In a world of income and regulatory uncertainty, the value of tax credits and hence of the parameter β is to some extent determined by their option value rather than by their immediate usefulness.[6]

3. The Data and Empirical Results

3.1 The Data

The data set consists of 510 loans originated during the period 1971-1981, from the World Bank's Debtor Reporting System. All loans are to the private sector, which surely pays the withholding tax, are denominated in U.S. dollars and specify the interest spread above LIBOR. For each loan we know the month of origination, the month of maturity, the loan amount, the debtor country, and the creditor country. Some loans are listed as multiple creditor loans. On a loan by loan basis, we collected the relevant interest withholding tax rates, taking note of bilateral tax treaties between debtor

and credit nations (see the Appendix for data sources). Multiple creditor loans are included if the debtor country imposes a uniform withholding tax rate on all outgoing bank interest payments.

Table 1 breaks down the loans by year of origination, and provides information on average interest spreads and withholding taxes for loans originated during the year. Spread is the spread above LIBOR written into the loan contract, while the variable S is constructed as this contractual spread divided by the 6-month LIBOR rate during the month of loan origination. The LIBOR rate proxies for the bank's cost of funds i*. Note that 166 of the loans were contracted in the years 1977 and 1978 alone. Note also that the average withholding tax rate has tended to fall over time. This trend is not the result of tax rate reductions in the borrower countries. Rather, countries with high withholding taxes, such as Brazil, were able to borrow in the early 1970's, while other countries had to wait till the mid and late 1970's to gain access to international bank credit. Also note the countercyclical pattern in the spread and S variables: they are low before and rise after both the 1973 and 1979 oil crises.

Table 2 provides summary data on loans for each of the 14 borrower countries in the data set. Among the major borrower countries, Korea and Mexico, with high withholding tax rates, generally received low spreads. Chile, Costa Rica and Honduras, with lower than average tax rates, contracted higher than average spreads. Brazil, with a high withholding tax rate of 25 per cent, received an average spread somewhat above the overall sample mean of 1.51, perhaps reflecting non-tax risk factors.

Table 3 breaks down the set of loans by creditor country. The major creditors are the United State and the United Kingdom with, between the two,

275 loans. The United Kingdom overall has provided loans with a lower than average spread to countries with higher than average tax rate. U.S. banks have provided relatively many loans to low tax countries, such as Costa Rica, Chile, and Honduras, as shown by a low average tax of 13.38 for U.S. loans, below the overall sample mean of 17.98. To some extent this may reflect the non-creditability of withholding takes on net loans till the mid 1970's.

Table 4 provided summary statistics for the spread and tax variables and the creditworthiness indicators for the whole sample. The first column states the means and standard derivations of the x_i variables, while the second column gives these statistics for the z_i. Average debt to GNP ratios for all loans are a modest 0.22 during this period of loan contraction. The loan amount, in billions of U.S. dollars, and loan maturity are the only loan specific variables. All other variables are country risk variables at the time of loan origination. Specifically, the debt and debt service variable are for the country as a whole. Note that in the 1970's and early 1980's, average debt service to exports already stood at a high 91 per cent. The table does not reflect that during the period average maturities substantially lengthened, as more and more loans were refinanced.

3.2 Empirical Results

The results of regressions of equation (4) are reported in Table 5. The first two columns include all 510 loans. The coefficient on the Tax variable shows that 56 per cent of creditor country tax credits are reflected in international credit terms. All controls, apart from the loan amount, are strongly significant. The ratio of imports to GNP enters negatively, which suggests that a country's openness helps to provide better international credit terms. Oddly, high inflation countries received better credit terms

than low inflation countries. This could reflect the perceived salutary impact of high seigniorage tax revenues on the national budget. The debt service to exports variable enters negatively, and may indicate bankers' throwing good money after bad. Ex post, we know that bankers made some unwise credit decisions, and these regressions to some extent appear to confirm this. Columns 3 and 4 only present results for the sample of loans from only U.S. banks. Fully 79 per cent of tax credits are shown to have been passed on to the debtor nations in the form of lower spreads. Results for the sample of U.K. loans, in columns 5 and 6, show a smaller tax effect of 43 percent.

Overall, the results indicate credit terms significantly reflect tax withholding tax rates. This tax effect is stronger for U.S. loans than for the general sample. This suggests lenient awarding of tax credits in the U.S. has caused international interest rates spread to fall to reflect tax credits rather than vice versa.

As pointed out, there was an important regime change when the Internal Revenue Service started recognizing the creditability of withholding taxes for net loans in the mid 1970's. As a result, the U.S. relative share of the international loan market increased in the late seventies: in the years 1976-1978 the U.S. awarded 52 per cent of its loans in the data set, while other countries made only 38 per cent of their loans. Table 6 provided estimates of the tax effects for U.S. and non-U.S. loans for this period of heavy U.S. lending. The tax effect for U.S. loans for this period at -0.924 indicates almost a full pass through of tax credits to borrowers. During this period, non-U.S. lenders were relatively uncompetitive, as they discounted only 61 per cent of potential tax credits.[7] Regressions for the

years 1979-1981, also in the table, show that the tax effect disappears for U.S. loans, and is reduced to around 21 per cent for non-U.S. loans. The vanishing tax effect for U.S. loans cannot be due to a change in the tax law, as at that time there had not yet been substantial changes in U.S. tax regulations. Of course, the effect to some extent may be due to rumblings of future changes. More likely, the tax effect declined in importance because (i) banks already had accumulated huge potential tax credits and (ii) in the wake of the second oil crisis bank taxable income was declining.

To explore the latter explanation further, Table 7 reports regression results for different time periods of loans origination for all creditors. The four periods roughly correspond to the periods leading up to and following the oil crises of 1973 and 1979. The actual years these oil crises arose were included in the pre-oil crisis periods, as bank taxable income can be assumed to respond with a lag to a downturn of the economy. Regardless of the exact cut-off points of the specific periods, what emerges is the result that the tax effect on interest rate spreads basically disappeared in the years following each of the two oil crises. Apparently, in those years banks did not value the prospect of tax credits, as taxable income was sufficiently sheltered either because there was no taxable income or because other sheltering methods were sufficient.

To support this, Table 8 provides same data on U.S. bank profitability and taxes for the years 1970-1985. In particular, the table provide data on gross income as a percentage of total assets, and of U.S. tax liability as a percentage of gross income for all banks traded on the New York Stock Exchange, and separately for the top 10 U.S. banks. The table shows that both measures were relatively low during the years 1973-1974 in the wake of

the first oil shock. Profitability and taxes then reached highs around 1978, and dropped off again in 1981. In particular, the average tax rate for the top 10 banks dropped from 35.72 in 1980 to 29.86 in 1981. Table 1 and 8 together indicate a negative correlation between the average U.S. tax rate paid by U.S. banks and the net interest charged on loans to developing countries.

The important implication is that credit supply to the developing countries is highly unstable. In times of world recession, cheap loans to developing countries tend to dry up, as banks do not need additional tax shelters. This scenario of unstable credit supply to developing countries, which in part caused later payments difficulties, has been described in detail by Devlin [1989]. Devlin argues that the unstable credit supply is due to shortcomings in risk assessment and particular characteristics of the banking industry, such as the relationship between lead banks and participating banks in loan syndicates, rather than due to external incentives provided to the banking industry in the form of, for instance, withholding tax credits.

By lending internationally, banks obtain the option to use tax credits for the duration of the loan, and for some time thereafter as tax credits in, for instance, the United States can be carried forward for seven years. Banks can be expected to value tax credits arising from short term loans close to one for one, as only banks that will surely use them will obtain them. Also, for short term credits there is little risk of an unforeseen changes in tax regulation. To test this, we estimate the tax effect for sets of loans of different maturities.

The results, in Table 9, show that for loans with maturities equal to or

less than 2 or 4 years the hypothesis that $\beta = 1$ cannot be rejected at the 5 per cent significance level. Generally, the longer loan maturities, the smaller the tax factor in the determination of loan interest spreads. For loans with a maturity of 9 or more years, there is no discernible tax effect at all. These results indicate that to maximize its tax credit related discounts, a country should obtain short term credit that are continually refinanced with possibly different banks. However, this effect should be balanced against the strong and independent negative impact of loan maturity on the interest rate spread that is evident in Table 5, and is confirmed throughout.

4. Conclusions

This paper has shown that tax credits available to creditor banks for withholding taxes paid in the developing country to a large extent are reflected in lower international interest rate spreads. Variation in the value of these tax credits has contributed to the variability of credit terms offered to developing countries during the 1970's and early 1980's. Specifically, the avalanche of credit that became available in the years 1977 and 1978 appears in important part due to (i) a surge in bank taxable income in need of a tax shelter and (ii) a shift in International Revenue Service policy which allowed the creditability of withholding taxes for net loans. These reasons for the credit surge are in addition to the standard explanation that at the time the banks were awash with deposits from the oil exporting countries.

In the period 1980-1981, international interest spreads do not reflect sizable tax credits. Apparently, the marginal value of obtaining additional

means of sheltering tax income was very low for the banking industry at that time. This may have contributed to the banks' refusal to simply refinance the old debt at comparable terms in the latter part of 1982 that set off the debt crisis of the 1980's. The build-up of debt by that time may have made a debt crisis inevitable. However, the low value of tax credits to the banks was one of the factors that caused the debt crisis to start in 1982, in addition to a restrictive macro policy in the U.S. that resulted in high real interest rates and a deep recession.

The value of tax credits of U.S. banks has been substantial. In 1976 and 1978, for instance, the respective values were $212.6 and $277.0 million.[8] These tax credits have to be added to interest payments by the country to get a fair picture of the true return of international lending to U.S. banks, and they make the banks appear less short-sighted than they are sometimes made out to be. These tax benefits are in addition to the substantial benefits of deposit insurance, which as argued by Penati and Protopapadakis [1988] is a major subsidy to international lending. Ozler and Huizinga [1989] show that the benefits of present federal deposit insurance are reflected in secondary market prices of LDC debt. Of course, secondary market prices of LDC debt and bank stock price should also reflect the creditability of withholding taxes, to the extent that the borrowing public and private entities are subject to these taxes.[9]

The creditability of withholding taxes should have affected international interest rates during the 1980's and 1990's as well, to the extent that recent regulations allow the creditability. Of course, interest rates on bank loans to developing countries during the 1980's to a large extent are the result of reschedulings of previously contracted debt. Thus

these interest rates are the outcome of complex bargaining between the banks and the developing countries, with the withholding tax creditability as only one of the determining factors. The impact of tax regulations on rescheduling agreements have at this point not been explored.

Appendix: Description of Data Sources.

The World Bank's Debtor Reporting System provides the following information on a loan by loan basis: debtor country, creditor country, month of loan origination, month of loan maturity, loan amount, and the interest rate spread. The selected loans are to the private sector, denominated in U.S. dollars, and specify the spread above LIBOR. Some loans with multiple creditor countries are included in the sample if the debtor country imposes a uniform interest withholding tax on all outgoing bank interest payments.

Information on the country's debt outstanding, and debt service are derived from the Debtor Reporting System as well.

Tax rates are compiled from the following sources:

Corporate Taxes, A Worldwide Summary (previously called Corporate Taxes in 80 Countries), Price Waterhouse (New York), various issues.

International Tax Summaries, Coopers and Lybrand (Wiley, New York), various issues.

Country information and tax treaty information from the following publications of International Bureau of Fiscal Documentation in Amsterdam:

African Tax Systems, Looseleaf, E. de Brauw-Hay and F. Butzelaar-Mohr, editors.

Taxation in Latin America, Looseleaf, P. Masson-Parodi, editor.

Taxes and Investment in Latin America, Looseleaf, J. van Hoorn, Jr., editor.

For some years, tax data has been interpolated or extrapolated, as tax rate information is not available for all years for all countries. However, tax rates, and especially internationally negotiated tax rates, tend to vary little from year to year.

All other data is from the IEC, the World Bank. Data for Gross Domestic Product is used instead of data for Gross National Product if the latter is not available.

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Table 1. Loans by Year of Origination.

Year	Number	r*100	Spread	S
1971	6	16.67	2.33	0.32
1972	65	23.48	1.66	0.29
1973	28	23.56	1.26	0.14
1974	32	23.16	1.30	0.12
1975	30	17.67	1.66	0.22
1976	46	14.35	1.79	0.30
1977	87	16.06	1.93	0.31
1978	79	17.53	1.57	0.18
1979	50	13.04	0.92	0.08
1980	44	17.61	0.99	0.07
1981	43	17.26	1.38	0.08

Note: Data are unweighted averages. See Table 4 for variable definitions, and the Appendix for data sources.

Table 2. Loans by Debtor Country.

Debtor Country	Number	r*100	Spread	S
Brazil	189	24.76	1.64	0.22
Chile	33	0.00	1.96	0.29
Costa Rica	48	0.00	1.84	0.25
Côte d'Ivoire	4	25.00	1.81	0.24
Cyprus	1	10.00	1.75	0.23
Dominican Republic	9	18.00	1.58	0.20
Gabon	2	18.00	1.88	0.29
Honduras	24	5.00	1.66	0.14
Jamaica	3	15.33	1.50	0.22
Korea	168	20.55	1.20	0.15
Mexico	21	21.00	0.98	0.12
Paraguay	2	30.00	1.01	0.14
Portugal	4	15.00	1.00	0.10
Turkey	2	0.00	1.75	0.20

Note: Data are unweighted averages. See Table 4 for variable definitions, and the Appendix for data sources.

Table 3. Loans by Creditor Country.

Creditor Country	Number	r*100	Spread	S
Adela	7	0.00	1.75	0.28
Bahamas	52	19.96	1.52	0.19
Bahrain	1	25.00	2.50	0.33
Barbados	1	25.00	1.13	0.12
Belgium	6	24.33	1.71	0.26
Canada	20	16.75	1.55	0.21
Cayman Islands	9	25.00	1.78	0.23
France	9	20.00	1.82	0.23
Germany	7	7.14	1.70	0.19
Hong Kong	10	25.00	1.25	0.15
Japan	8	12.13	1.03	0.12
Liberia	1	25.00	1.50	0.09
Luxembourg	8	25.00	1.48	0.20
Netherlands	3	25.00	1.67	0.25
Netherlands Antilles	1	25.00	0.00	0.00
Norway	7	5.00	2.41	0.40
Panama	21	10.24	1.88	0.24
Spain	8	25.00	1.48	0.20
Singapore	3	25.00	1.25	0.17
Sweden	1	25.00	2.00	0.41
Switzerland	13	15.38	1.48	0.21
United Kingdom	147	20.49	1.41	0.19
United States	128	13.38	1.58	0.20
Multiple Lenders	11	15.55	1.45	0.11

Note: Data are unweighted averages. See Table 4 for data definitions, and the Appendix for data sources.

Table 4. Sample Characteristics.

Spread	1.51 (0.61)	
S	0.20 (0.12)	
r	0.18 (0.10)	
Inf	0.06 (0.05)	0.05 (0.05)
Invgnp	0.25 (0.06)	0.23 (0.06)
Debtgnp	0.22 (0.10)	0.20 (0.11)
Debtsexp	0.91 (0.55)	0.82 (0.50)
Resgnp	0.05 (0.02)	0.04 (0.02)
Resimp	1.17 (0.76)	1.01 (0.61)
Impgnp	0.06 (0.03)	0.05 (0.03)
Amount	0.010 (0.032)	0.01 (0.03)
Mat	6.33 (2.41)	5.62 (2.11)

Note: Information on the mean and standard deviation in parentheses in the two columns are for x_i and z_i respectively.

Variable Definitions:

Spread	=	contractual spread over LIBOR
S	=	ratio of spread and monthly 6-month LIBOR rate at time of loan origination
τ	=	interest withholding tax rate (as a share)
Inf	=	rate of inflation (quarterly)
Invgnp	=	ratio of investment to gnp (annual)
Debtgnp	=	ratio of external debt to gnp (annual)
Debtsexp	=	ratio of debt service to exports (annual)
Resgnp	=	ratio of reserves to gnp (annual)
Resimp	=	ratio of reserves to imports (annual)
Inpgnp	=	ratio of imports to gnp (annual)
Amount	=	loan amount in billions of U.S. dollars
Mat	=	loan maturity in years, with parts of a year counted

Table 5. Regression Results for All Loans, U.S. Loans and U.K. Loans.

	All Creditors		United States		United Kingdom	
C	0.758	0.760	0.799	0.791	0.776	0.752
	(21.57)	(21.76)	(10.15)	(11.32)	(7.87)	(9.91)
r	-0.556	-0.559	-0.777	-0.785	-0.433	-0.406
	(9.05)	(9.16)	(5.79)	(6.17)	(1.98)	(2.20)
Inf	-0.471	-0.467	0.163		-0.257	
	(4.59)	(4.58)	(0.85)		(0.89)	
Invgnp	-0.560	-0.563	-0.003		-1.001	-0.981
	(5.72)	(5.78)	(0.02)		(3.38)	(4.44)
Debtgnp	0.149	0.150	-0.065		-0.183	
	(2.12)	(2.14)	(0.53)		(0.58)	
Debtsexp	-0.077	-0.079	-0.065	-0.065	-0.085	-0.117
	(7.39)	(8.21)	(3.31)	(3.46)	(2.48)	(6.18)
Resgnp	0.897	0.891	1.800	1.513	0.877	0.879
	(3.16)	(3.14)	(3.28)	(3.00)	(1.66)	(1.79)
Resimp	-0.052	-0.051	-0.134	-0.122	-0.036	-0.024
	(4.07)	(4.05)	(3.90)	(3.74)	(1.61)	(1.22)
Impgnp	-2.866	-2.864	-4.189	-4.157	-1.273	-1.516
	(7.18)	(7.18)	(5.48)	(6.41)	(1.21)	(2.51)
Amount	-0.061		-0.528	-0.526	-0.121	
	(0.41)		(1.76)	(1.76)	(0.21)	
Mat	-0.020	-0.020	-0.024	-0.023	-0.018	-0.019
	(9.99)	(10.12)	(5.33)	(5.59)	(4.75)	(5.41)
R^2	0.52	0.52	0.55	0.54	0.72	0.72
N	510	510	128	128	147	147

Note: The dependent variable is the loan spread above LIBOR divided by the LIBOR rate. Parentheses indicate t-statistics. See Table 4 for variable definitions.

Table 6. U.S. and Non-U.S. Loans After Change in U.S. Tax Regulation

	r	R^2	N
U.S. loans			
1976-1978	-0.924 (3.65)	0.49	67
1979-1981	-0.115 (0.32)	0.67	31
Non-U.S. loans			
1976-1978	-0.614 (5.05)	0.52	145
1979-1981	-0.208 (2.37)	0.45	106

Notes as for Table 5.

Table 7. The Impact of the Business Cycle.

	r	R^2	N
Before 1975	-0.464 (2.72)	0.56	131
1975-1976	0.021 (0.11)	0.35	76
1977-1979	-0.633 (6.75)	0.67	216
1980-1981	-0.068 (0.51)	0.41	87

Notes as for Table 5.

Table 8. U.S. Banks' Income and Taxes

Year	Banks traded on NYSE		Top 10 banks	
	Gross Income / Assets	Taxes / Gross Income	Gross Income / Assets	Taxes / Gross Income
1970	0.97	33.27	0.88	34.57
1971	0.95	32.22	0.90	34.87
1972	0.82	30.70	0.77	33.05
1973	0.78	31.95	0.75	35.38
1974	0.73	31.60	0.73	35.66
1975	0.78	33.96	0.78	38.21
1976	0.76	33.50	0.74	37.32
1977	0.73	32.69	0.69	35.48
1978	0.82	34.50	0.79	37.82
1979	0.83	32.48	0.80	36.61
1980	0.81	30.80	0.79	35.72
1981	0.75	24.45	0.68	29.86
1982	0.70	22.57	0.68	28.82
1983	0.83	30.12	0.86	35.45
1984	0.69	33.94	0.76	30.79
1985	0.85	30.73	0.75	32.42

Date Source: Bank Compustat. All numbers are percentages. The top 10 banks are: Citicorp, BankAmerica, Chase Manhattan, Manufacturer's Hanover, J.P. Morgan, Chemical, Security Pacific, First Interstate, Bankers Trust, and First Chicago.

Table 9. Loans of Different Maturities.

	τ	R^2	N
Mat ≤ 2	-1.230 (3.13)	0.60	28
Mat ≥ 3	-0.536 (8.50)	0.50	482
Mat ≤ 4	-0.940 (5.33)	0.50	95
Mat ≥ 5	-0.499 (7.73)	0.53	415
Mat ≤ 6	-0.670 (6.77)	0.39	282
Mat ≥ 7	-0.326 (3.35)	0.43	228
Mat ≤ 8	-0.605 (8.81)	0.52	430
Mat ≥ 9	-0.085 (0.54)	0.31	80

Notes as for Table 5.

Endnotes

1. See Foreign Tax Credits for Banks (KPMG), p. 171.

2. See The Banker's Guide to the Tax Reform Act of 1986 (Peat, Marwick, Mitchell & Co.), p. 88.

3. According to U.S. tax regulations, the foreign tax credit actually taken can not exceed the U.S. tax on the foreign source income. Hence, if the foreign tax paid exceeds the U.S. tax due, then the bank will be in an excess credit position.

4. Equation (1) assumes away the possibility that a bank can collect rents due to an informational or other advantage. The extent to which banks are forced to pass on tax credits depends on various aspects of the banking market structure that are beyond the scope of this study.

5. For $\beta = 1$, (5) exactly corresponds to (4). For $\beta \neq 1$, the correspondence is not exact, and β in (5) approximates the β in previous equations. Below, it is shown that for various regressions the hypothesis of $\beta = 1$ is not rejected.

6. For a discussion of the usefulness of potential tax credits in reducing future tax rates in a world of uncertainty, see Altshuler and Auerbach [1990, p.76].

7. Regressions on U.S. loans and non-U.S. loans for the period before 1976 yield tax effects of -0.821(3.61) and -0.409(2.73) with samples of 30 and 131 loans. The estimate of the U.S. tax effect prior to 1975 yields 1.371(2.19) for a sample of 22, while estimate for non-U.S. loans for the same period is -0.403(2.31) with 109 loans. These results suggest a clean regime break in the case of the U.S., although the small sample size limits the meaning of both U.S. estimates.

8. See Internal Revenue Service Statistics of Income - 1976-1979, International Income and Taxes, Foreign Income and Taxes Reported on U.S. Income Tax Reforms, Table 2, p. 97 and Internal Revenue Service Statistics of Income, Compendium of Studies of International Income and Taxes, Table 1, p.36.

9. Sachs and Huizinga [1987] show that bank stock prices reflect third world debt holdings without taking into account differences in withholding tax rates.

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